

What is claimed is:

1. A high frequency communication device comprising:

5 a box containing a high frequency circuit element; and
an antenna;

10 wherein at least a part of a wall of said box has a periodic structure which provide a periodic pattern of materials or mechanical configurations.

2. A high frequency communication device according to claim 1,

15 wherein said a periodic structure is formed on an inside wall of said box.

3. A high frequency communication device according to claim 2,

20 wherein a period P of said periodic structures which provide a periodic pattern is in a range of " $(2N + 1) \lambda / 5 \leq P \leq (2N + 1) 5\lambda / 9$ ", where N is 0 or an integer, and λ is a free-space wavelength with respect to a design frequency.

25 4. A high frequency communication device according to claim 2,

wherein a plurality of groups of said periodic structures are disposed on a plurality of areas in said

box, each said group of periodic structures being arranged to provide a periodic pattern, and

wherein a period P of each said group of periodic structures on each said area in said box is in a range of " $(2N + 1) \lambda / 5 \leq P \leq (2N + 1) 5\lambda / 9$ ", where N is 0 or an integer, and λ is a free-space wavelength with respect to a design frequency on each said area.

5. A high frequency communication device according to claim 1,

wherein said antenna is formed outside said box, and

wherein said high frequency circuit element is provided with input and output terminals for connection with said antenna.

6. A high frequency communication device according to claim 1,

wherein said antenna is formed inside said box, and

wherein a window for passage of radio waves is provided on a wall of said box in the vicinity of said antenna.

7. A high frequency communication device according to claim 2,

wherein said antenna is formed outside said box, and

wherein said high frequency circuit element is provided with input and output terminals for connection with said antenna.

5 8. A high frequency communication device according to claim 3,
 wherein said antenna is formed outside said box,
 and

10 wherein said high frequency circuit element is provided with input and output terminals for connection with said antenna.

15 9. A high frequency communication device according to claim 4,
 wherein said antenna is formed outside said box,
 and

 wherein said high frequency circuit element on each said area is provided with input and output terminals for connection with said antenna.

20 10. A high frequency communication device according to claim 2,
 wherein said antenna is formed inside said box,
 and

25 wherein a window for passage of radio waves is provided on a wall of said box in the vicinity of said antenna.

11. A high frequency communication device
according to claim 3,

wherein said antenna is formed inside said box,
and

5 wherein a window for passage of radio waves is
provided on a wall of said box in the vicinity of said
antenna.

12. A high frequency communication device
according to claim 4,

wherein said antenna is formed inside said box,
and

10 wherein a window for passage of radio waves is
provided on a wall of said box in the vicinity of said
15 antenna.